

AMENDED CLAIMS

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Original claims 1-45 replaced by amended claims 1-49]
+ STATEMENT

Claims

1. A method of holographic data storage on a photosensitive holographic data storage media which comprises the steps of recording one or more holograms representing computer readable data at one or more locations on the media, and after such recording exposing the media with sufficient energy to fix the media against further recording in said locations, wherein said media is of photopolymer material.
2. The method according to Claim 1 wherein said holographic media has a dynamic range capable of accepting a multiplicity of holographic images, said recording step is carried out over a portion of said dynamic range, and said exposing step is carried out over the remainder of said dynamic range.
3. The method according to Claim 1 wherein said exposing step provides exposure energy over an energy range greater than that used in said recording step.
4. The method according to Claim 1 wherein said exposing step is carried out using an optical source providing optical wavelengths that the holographic media is photosensitive to.
5. The method according to Claim 1 wherein said exposing step is carried out using an optical source containing wavelengths that the holographic media absorbs and which causes thermal heating of the media in locations where the wavelengths are applied.
6. The method according to Claim 5 wherein the exposing step is carried out using a heat source.
7. The method according to Claim 1 wherein the exposing step is carried out with a heat source and an optical source.
8. The method according to Claim 1 wherein said recording step uses an optical beam which is redirected to said medium to carry out said exposing step.
9. The method according to Claim 8 wherein said optical beam is a reference beam.

10. The method according to Claim 4 wherein said reference beam used for fixing is passed through said media and redirected to said media for fixing said media in location other than locations which is recorded with said reference beam and fixed by said reference beam on being directed through said media at a location spaced from said recording location.

11. The method according to Claim 1 wherein said exposing step is carried out on said medium in a fixing station separate from a holographic data storage system.

12. The method according to Claim 1 wherein said exposing step is carried out by flooding said media with optical, thermal or other electromagnetic energy sufficient to fix said media after recording of holographic images thereon.

13. The method according to Claim 1 wherein said exposing step is carried out by collecting optical energy used for recording and redirecting said energy to a location on said media where fixing is carried out.

14. The method according to Claim 1 wherein the exposing step is carried out by beams oriented, diffused or having coherency insufficient to record spurious holographic images.

15. The method according to Claim 13 wherein said collected light is recollected and passed through different locations of said medium on multiple passes thereby fixing a plurality of locations at the same time.

16. The method according to Claim 1 wherein said exposing step is carried out at locations simultaneously with new recording at another location in said media.

17. The method according to Claim 1 wherein said exposing step is carried out in multiple ones of said exposing step in order to sufficiently fix the media.

18. An apparatus for holographic data storage on a photosensitive holographic data storage media which comprises means for recording one or more holograms representing computer readable data at one or more locations on the media, and means operative after such recording for exposing the media with sufficient energy to fix the media against further recording in said locations, wherein said media is of photopolymer material.

19. The apparatus according to Claim 18 wherein said holographic media has a dynamic range capable of accepting a multiplicity of holographic images, said recording means is operative for recording over a portion of said dynamic range, and said exposing means is operative over the remainder of said dynamic range.

20. The apparatus according to Claim 18 wherein said exposing means is operative to provide exposure energy over an energy range greater than that over which said recording means is operative.

21. The apparatus according to Claim 18 wherein said exposing means comprises an optical source providing optical wavelengths that the holographic media is photosensitive to.

22. The apparatus according to Claim 18 wherein said exposing means comprises a source containing wavelengths that the holographic media absorbs and which causes thermal heating of the media in locations where the wavelengths are applied.

23. The apparatus according to Claim 22 wherein the source is a heat source.

24. The apparatus according to Claim 22 wherein said source comprises a heat source and an optical source.

25. The apparatus according to Claim 18 wherein said recording means comprises means for providing an optical beam, and said exposing means comprises means for redirecting said optical beam to said media.

26. The apparatus according to Claim 25 wherein recording means is operative to provide said optical beam as a reference beam.

27. The apparatus according to Claim 25 wherein said recording means is operative to use said reference beam for fixing, means for passing said reference beam through said media and redirecting said reference beam which is passed through said media for fixing said media in locations other than locations which are recorded with said reference beam and fixed by said reference beam on being directed through said media at a location spaced from said recording location.

28. The apparatus according to Claim 18 wherein said exposing means comprises means for flooding said media with optical, thermal or other electromagnetic energy sufficient to fix said media after recording of holographic images thereon.

29. The apparatus according to Claim 18 wherein said exposing means is operative on said media in a fixing station spaced from said recording means.

30. The apparatus according to Claim 18 wherein said exposing means is operative by collecting optical energy from said recording means and redirecting said energy to a location on said media where fixing is carried out.

31. The apparatus according to Claim 18 wherein said exposing means is operated by a beam oriented, diffused or having coherence insufficient to record spurious holographic images.

32. The apparatus according to Claim 30 wherein said exposing means operative with collected optical energy used for recording which is recollected and passed through different locations of said media on multiple passes thereby fixing a plurality of locations at the same time.

33. The apparatus according to Claim 18 wherein said exposing means is effective at locations which have been recorded simultaneously with recording at another location in said media.

34. The apparatus according to Claim 18 wherein said exposing means is operative by multiple exposures of said media in order to sufficiently fix the media.

35. An apparatus for fixing holographic data storage on a photosensitive holographic data storage media having one or more locations of recorded holograms, said apparatus comprising means for exposing the media with sufficient energy to fix the media against further recording in said locations.

36. The apparatus according to Claim 35 wherein said exposing means is operated by a beam oriented, diffused or having coherency insufficient to record spurious holographic images.

37. The apparatus according to Claim 35 wherein said exposing means comprises an optical source providing optical wavelengths that the holographic media is photosensitive to.

38. The apparatus according to Claim 35 wherein said exposing means comprises a source containing wavelengths that the holographic media absorbs and which causes thermal heating of the media in locations where the wavelengths are applied.

39. The apparatus according to Claim 38 wherein the source is a heat source.

40. The apparatus according to Claim 38 wherein said source comprises a heat source and an optical source.

41. The apparatus according to Claim 35 wherein said exposing means comprises means for flooding said media with optical, thermal or other electromagnetic energy sufficient to fix said media.

42. The apparatus according to Claim 35 further comprising means for recording one or more holograms representing data at one or more locations on the media.

43. The apparatus according to Claim 42 wherein said exposing means is operative on said media in a fixing station spaced from said recording means.

44. The apparatus according to Claim 42 wherein said exposing means is operative by collecting optical energy from said recording means and redirecting said energy to a location on said media where fixing is carried out.

45. The apparatus according to Claim 42 wherein said exposing means is operative to provide exposure energy over an energy range greater than that over which said recording means is operative.

46. A method of holographic data storage on a photosensitive holographic data storage media which comprises the steps of recording one or more holograms representing data at one or more locations on the media, and after such recording exposing the media with sufficient energy to fix the media against further recording in said locations by collecting optical energy used for recording and redirecting said energy to at least one of said locations on said media where fixing is carried out.

47. The method according to Claim 46 wherein said collected light is recollected and passed through different locations of said medium on multiple passes thereby fixing a plurality of said locations at the same time.

48. An apparatus for holographic data storage on a photosensitive holographic data storage media which comprises means for recording one or more holograms representing data at one or more locations on the media, and means operative after such recording for exposing the media with sufficient energy to fix the media against further recording in said locations by collecting optical energy from said recording means and redirecting said energy to at least one of said locations on said media where fixing is carried out.

49. The apparatus according to Claim 48 wherein said exposing means is capable of fixing a plurality of said locations at the same time.